Lodam
BY BITZER GROUP

Lodam Optical Level Controlling Devices

Technical manual

Version 2.0

OLC-D1, OLC-K1

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1. Read this first

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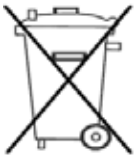


Disposing of the parts of the controller:

INFORMATION FOR USERS ON THE CORRECT HANDLING OF WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE)

In reference to European Union directive 2002/96/EC issued on 27 January 2003 and the related national legislation, please note that:

1. WEEE cannot be disposed of as municipal waste and such waste must be collected and disposed of separately;
2. The public or private waste collection systems defined by local legislation must be used. In addition, the equipment can be returned to the distributor at the end of its working life when buying new equipment;
3. The equipment may contain hazardous substances: the improper use or incorrect disposal of such may have negative effects on human health and on the environment;
4. The symbol (crossed-out wheeled bin) shown on the product or on the packaging and on the instruction sheet indicates that the equipment has been introduced onto the market after 13 August 2005 and that it must be disposed of separately;
5. In the event of illegal disposal of electrical and electronic waste, the penalties are specified by local waste disposal legislation.

1.1. Reading instructions

The following symbols are used to draw the reader's attention to different warning levels.

Important information.

Danger!! General danger.

Danger of electrical current or voltage.

1.2. User manual

Before installation the user should be thoroughly familiarized with this user manual, especially with purposes, installation and operation.

Special care should be taken when installing and connecting external equipment (high voltage etc.) and handling the modules correctly according to protection against ESD.

Installation of the OLC-D1/OLC-K1 must be performed by authorized personnel only. All valid national legislations regarding electrical installations must be observed.

All warranties are excluded in case installation is performed by unauthorized personnel or in case the OLC-D1/OLC-K1 has not been correctly installed.

1.3. Safety

The OLC-D1/OLC-K1 is a protection device and not a safety component according to the Machinery Directive and cannot be used in "medical" or "life support" equipment.

Before plant commissioning the service technician shall ensure that personal safety requirements are met in conformity with the Machinery Directive on the basis of safety estimations.

Electrical plant failures are to be immediately solved, even though no immediate danger exists; the OLC-D1/OLC-K1 must be without power.

2. General

The OLC-D1 and OLC-K1 are Optical Level Controlling devices. The OLC-K1 is for monitoring oil level in compressors while the OLD-D1 is for controlling levels in vessels.

The relay in OLC-K1 is used in the safety chain for the compressor and will open and lock-out in case of a failure.

OLC-D1 is meant for keeping a specified level in a vessel by turning the relay on and off.

3. Definitions

Product range

Definitions	
ESD	Electro Static Discharge
HW	Hardware/electronics
OLC	Optical Level Controller
NC	Normally Closed (relay)
NO	Normally Open (relay)

4. Functions

The OLC series consists of the two models, OLC-D1 and OLC-K1. They have different monitoring functions which are listed in the following.

4.1. Level monitoring

The OLC series consists of a screw-in prism unit and an optical level detection device. The prism unit is installed in the compressors oil chamber or in the vessel.

The level detection device can be replaced without opening to the pressurized part of the compressor or vessel. Detection of the level is via infrared light. There is a built-in monitoring system for correct installation.

4.2. Oil level monitoring

The OLC-K1 is used for contactless oil level monitoring in compressors in order to safeguard sufficient lubrication of the internal mechanics.

As the refrigerant can be absorbed by oil, fluctuation of the oil level in the compressor is common in refrigeration systems and thereby oil levels need to be monitored.

OLC-K1 is for compressor use and locks out if oil level is not sufficient after 90 seconds of compressor operation.

4.3. Level monitoring in vessels

The OLC-D1 is meant for level monitoring in vessels and does not have the operation recognition input needed for compressor operation.

The OLC-D1 releases the relay if the level is too low and activates the relay if the level is valid. There is a 5 seconds time delay between switching the relay.

4.4. Red LED status light

At start-up, the OLC will flash shortly with the LED. After approx. 3 seconds the relay will be activated.

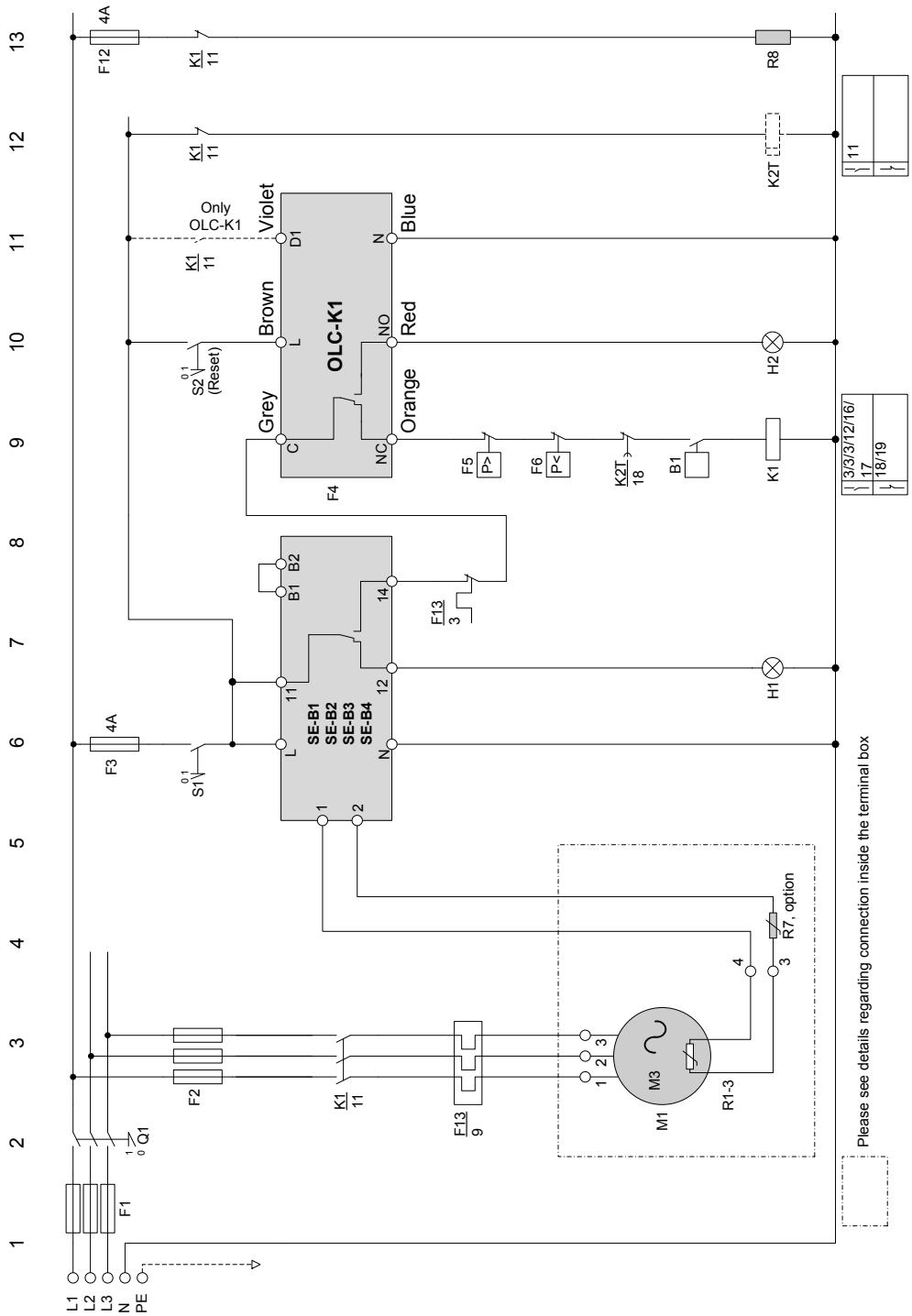
For OLC-D1 the level monitoring starts immediately; for the OLC-K1 monitoring starts when the D1 signal is applied and after the 90 seconds delay time the level is evaluated.

If the oil level is too low or there is a failure, the relay will be opened and the LED will signal the failure.

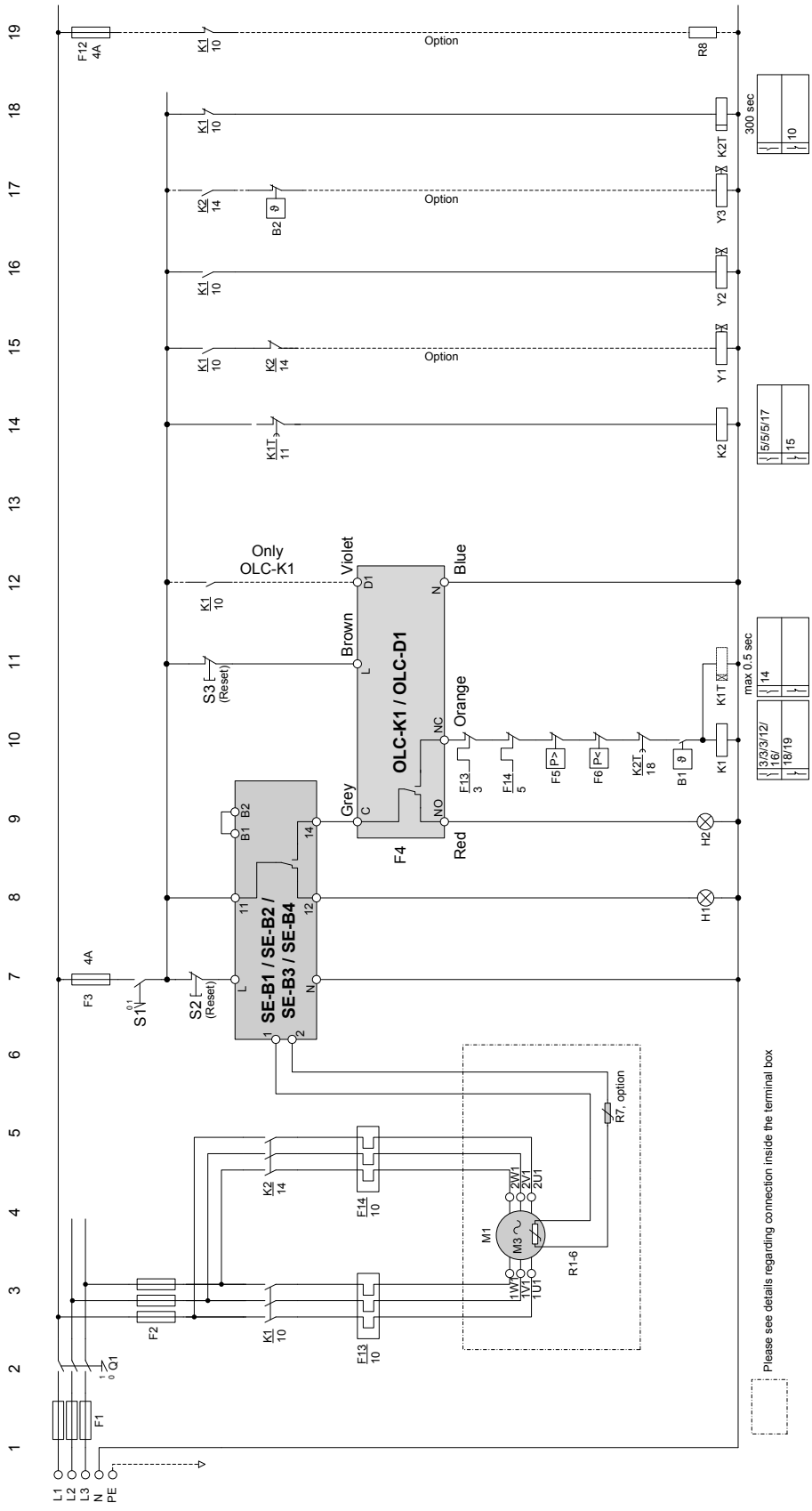
- LED Off: Oil level good, no failures
- LED On: Oil level low
- LED flashing: OLC not correctly mounted, or Supply voltage too low, or Internal failure

5. Examples of application use

5.1. Oil level monitoring on a compressor – direct start



5.2. Oil level monitoring on a compressor – part-winding



5.3. Legend for the schematic diagrams

Legend	Function
B1	Control unit
B2	Control unit of capacity regulation (option)
F1	Main fuse
F2	Compressor fuse
F3	Control circuit fuse
F4	OLC-K1. Optical Level Controlling device
F5	High pressure limiter
F6	Low pressure limiter
F12	Oil heater fuse
F13	Thermal motor overload relay
F14	Thermal motor overload relay – part-winding connection
H1	Signal light “Compressor over temperature fault”
H2	Signal light “Oil supply fault” / “Vessel level low”
K1/K2	Motor contactors
K1T	Time relay Start-up delay
K2T	Time relay for part-winding connection / Time relay oil flow monitoring
M1	Compressor
Q1	Main switch
R1-3 / R1-6	PTC sensors in motor windings
R7	PTC sensor in cylinder head/discharge gas temperature sensor (option)
R8	Oil heater (option)
S1/S2/S3	Control switch
YI	Solenoid valve “Start unloading” (option)
Y2	Solenoid valve “Liquid line”
Y3	Solenoid valve “Capacity regulation” (option)

5.4. Connections

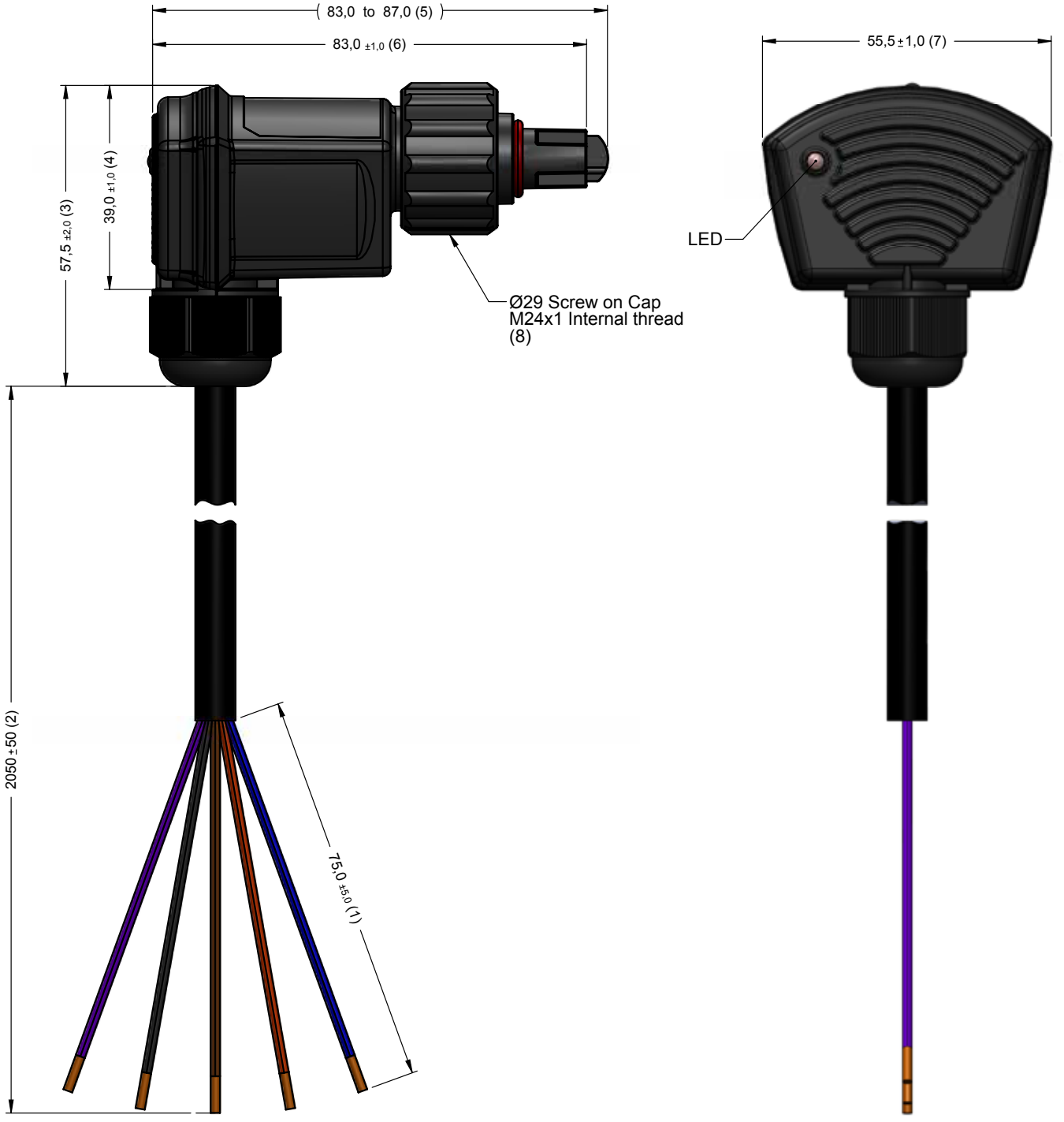
Wiew colour	Function
Brown	L; Phase
Blue	N; Neutral
Grey	C; Common signal
Orange	NC; Normal closed
Pink	NO; Normal open
Violet (only OLC-K1)	D1; Compressor running

6. Technical data

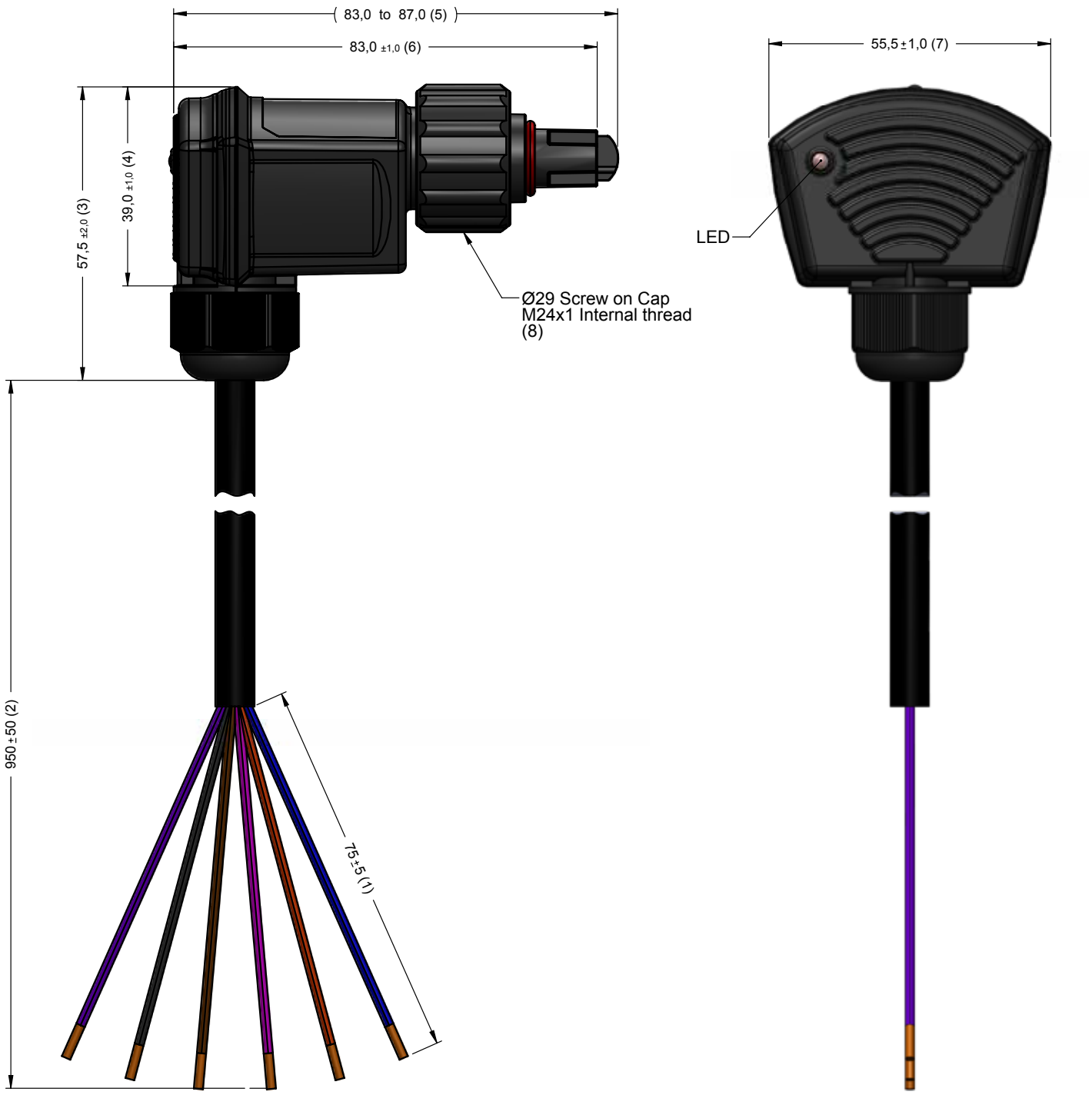
Description	OLC-D1	OLC-K1
Supply voltage	115 VAC; ffl10%, 50/60 Hz, 3VA 230 VAC; ffl10%, 50/60 Hz, 3VA	115 VAC; ffl10%, 50/60 Hz, 3VA 230 VAC; ffl10%, 50/60 Hz, 3VA
Max media temperature	+120°C	+100°C
Lock-out	Failure	Failure Low oil level
Wires in cable	5	6
Compressor-start signal input	No	Yes; violet wire
Permitted ambient temperature	Operation: -30°C – +60°C Storage: -30°C – +80°C	
Relative humidity	Max. 95%RH non-condensing. Circuit board is coated	
Relay	Switch voltage 240 VAC Continuous current max 2.5A Switching capacity 300 VA, C300 (pilot type use according to UL508)	
Fuse required	Max 4A, fast-blow	
Enclosure class	Housing IP54; cable outlet pointing downwards	
Mounting of the detection circuit	Screw mounted, M24 Max. tightening torque: 10 Nm by hand only	
Reset of lock-out state	Interrupt supply power for min. 5 seconds	
Cable length	2050 ffl50 mm	950 ffl50 mm
Weight	252 g	152 g
Dimensions	55.5 mm (w) x 87.0 mm (d) x 57.5 mm (h)	
UL file number	E348183	

7. Drawings

7.1. OLC-D1



7.2. OLC-K1


83,0 to 87,0 (5)
83,0 ±1,0 (6)
57,5 ±2,0 (3)
39,0 ±1,0 (4)
Ø29 Screw on Cap
M24x1 Internal thread
(8)
950 ±50 (2)
75±5 (1)
55,5 ±1,0 (7)
LED

8. Standards

8.1. The product is designed according to the following standards

- 2002/95/EC RoHs compliance
- 2006/95/EC Low Voltage Directive (LVD)
- 2004/108/EC Electromagnetic Compatibility (EMC)
- 61010-1 Safety requirement for electrical equipment for measurement and control
- 61000-6-x Generic EMC

8.2. The product is tested according to the following standards

- EN 61010-1 Safety requirement for electrical equipment for measurement and control
- EN 61000-6-1 (EMC, Immunity for residential, commercial and light-industrial environments)
- EN 61000-6-3 (EMC, Emission standard for residential, commercial and light-industrial environments)
- UL 60730
- UL file number E348183

9. Troulbe shooting

- Check if there is power to the unit according to specification. If the power is ok,
- Turn off the power for 5 seconds and see if the relay is energized after power on again.

If not, turn off all the power to avoid risk of injury!

9.1. Check the LED on the OLC

- ED Off: Oil level good, no failures
- LED On: Oil level low – there could be a leak or the oil is somewhere else in the cooling system and unavailable for the compressor
- LED is flashing:
  1) OLC is not correctly mounted – check that the device is mounted correctly in the prism and the turn-ring is tightened properly. If the LED flashes during start-up there may be foreign light entering the prism from outside
  2) The supply voltage might be too low. Check voltage levels
  3) The device has an internal fault and needs replacement

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11. Notes

Innovative and energy saving **climate control**

When it comes to climate control Lodam is one of the most experienced you can turn to. For more than four decades we have developed, produced and implemented electronic solutions dedicated to optimising applications like:

- Compressors
- Condensing units
- Heat pumps
- Air conditioning
- Refrigerated truck and trailer
- Reefer containers

We know the importance of reliable, energy-efficient operation – and constantly push technological boundaries to bring you the most innovative and forward-thinking solutions.

As part of the BITZER Group we are backed by one of the world's leading players in the refrigeration and air conditioning industry. This alliance provides us with extensive network and application knowhow and allows us to stay at the forefront of climate control innovation. And to help ensure comfortable surroundings for humans and reliable protection of valuable goods anywhere in the world.

29-01-2015 Contents are subject to change without notice.

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